Singapore Journal of Tropical Geography

doi:10.1111/sjtg.12068

Access to reeds and mat making in the lower Volta basin of Ghana

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This paper explores the origins of pressures on reeds and sedges used for mat making in the lower Volta basin of Ghana, and their impact on the socially embedded system which dictates access to reed fields. Data for the study were collected through field work employing participatory rural appraisal methods in 18 communities, involving 152 mat weavers. The findings showed that the mat-weaving industry has contributed immensely in providing poor women a means of livelihood but reed marshes in the basin have reduced in recent years due to hydrological changes in the area caused by the damming of the Volta upstream. The decline in the availability of reed is exerting immense pressure on this once freely available resource, thus inducing landlords to impose a price on the rights of entry into marshlands by reed collectors. The imposition of these charges affected the very people that the mat-weaving industry is targeted to help. The study recommends the local and central government to play a more active role and civil society groups to broaden the livelihood base of women living in this region.

Keywords: access, reeds and sedges, mat weaving, tenure security, livelihoods, Ghana

Introduction

Mat making using local reeds and sedges provides an important source of income for the poor, particularly women, in the lower Volta basin of Ghana. Unfortunately, for a variety of reasons, there are growing pressures on the resource base. Tenure insecurity and commercialization of marshlands where the resource is found are major concerns of mat producers. Prior to the damming of the Volta River, about 80 km upstream of the lower basin, there were few or no restrictions on access to reeds. Several studies suggested that the reeds were underexploited in many locations during that period due to the flourishing fishing and clam picking industries (Volta River Project, 1956; Lawson, 1972; T-Vieta, 1989). However, the hydrological changes following the damming of the Volta River in the early 1960s appeared to have affected the growth of reeds and hence their access. At the same time, the collapse of the clam industry (an age-long female economic activity in the lower Volta basin) (T-Vieta, 1989) compelled women to shift to mat weaving, resulting in a massive expansion in demand for reeds. Lack of female empowerment and tenure insecurity rooted in the cultural norms (Ayivor, 2001) make it difficult for women engaged in mat making to gain access to reeds in the area. This socially embedded system, which dictates rights of entry to the reed fields, together with changing socio-economic and institutional factors governing access, invariably affects rural livelihoods especially that of women. This paper explores the origins of pressures on reeds and sedges in the lower Volta basin, the significance of these coastal zone plant materials in the livelihoods of the poor and especially female mat weavers, and how policy changes to resource access could improve current conditions.

Studies on access to materials used in local handicraft industry in Ghana are few. Olwig and Gough (2013) demonstrated, among other things, how population-induced land use change, and to a lesser extent climate change, have brought about a short fall

Singapore Journal of Tropical Geography **35** (2014) 197–212

in the supply of materials (straw) used in the local basket weaving industry in northern Ghana. The shortage, according to them, led to imports of the materials and migration of young artisans to other parts of Ghana through social network. The Japan Association for International Collaboration of Agriculture and Forestry (2010) studied how fibre plants—notably bamboo and rattan, as well as grasses like *Vetiveria nigritana, Panicum maximum*, *Cyperus articulatus* and *Typha domingensis*—can be used to generate income in Ghana. Oteng-Amoako *et al*. (2001) provided an understanding of rattan production-to-consumption system in Ghana, identifying constraints and suggested some interventions. They argued that though the future of the industry seems bright because of increasing demand for rattan products, its sustainability is threatened by overexploitation of the raw material. Ofori (2000) studied the exploitation and use of reeds for mat making in the lower Volta basin, and argued that the role of the middleperson in the mat distribution chain expanded the marketing base of mats but without any corresponding expansion in reed fields.

These records suggest that most of the earlier works on the handicraft industry in Ghana had centred on the use and marketing of fiber plants, with little or no mention of how these products are accessed. The current study, unlike the earlier ones, focuses on access to the raw material used in the handicraft industry and its implications for the poor who are engaged in the industry. This study adopts the International Fund for Agricultural Development (IFAD) (2008) conceptual framework, which demonstrates the relationship between land tenure issues and rural livelihoods, and acknowledges the complexity and dynamics of evolving rural realities. According to the concept, crops, livestock, natural products and forest resources under common property regimes continue to make a decisive contribution to the incomes of poor and food-insecure households and diverse livelihood strategies. For these vulnerable groups, access to land and tenure security are among the main factors influencing their choice of livelihood and prospects, and representing food security and stable streams of income in limited, seasonal and relatively less remunerative rural labour markets.

The concept of livelihoods is people-centred and seeks to understand how people convert their strengths (assets or capital endowments) into positive outcomes (Department for International Development, 1999). The framework implies that when livelihood assets like land are restricted, it would have a direct influence on their well-being. In such situations, people seek ways to nurture and combine their assets in innovative ways to ensure survival (DFID, 1999).

Contemporary views on access to land-based resources and the local handicraft industry

Research has shown that access to land is a source of power and wealth in social relations, and provides more wealth creation opportunities (Hudson-Rodd & Nynth, 2001). Thus, most approaches to rural poverty alleviation and social equity rely heavily on access to property rights in land and the security of those rights (DFID, 2001). Land tenure systems, defined as rules, norms and institutions, govern how, when and where people can access land or are excluded from access (IFAD, 2008).

Contemporary debates on access to land and its resources have centred on poverty, vulnerability and livelihood issues. Baumann (2002) observed that access to resources, assets and entitlements together, give people the capabilities to pursue livelihood strategies that may improve their well-being. Hence, access may be directly linked to poverty alleviation. Several authors who share this view have demonstrated how access to land

and its resources had served as a primary source of wealth, social status and power (Feder *et al.*, 1993; Rocheleau & Edmond, 1997; Beck & Nesmith, 2001; Adhikari, 2005).

There is also the view point that natural resources may be degraded when access to common property resources is unrestricted and overused because no individual bears the full cost of degradation. Hardin (1968) described this situation as 'freedom in the commons' leading to 'tragedy of the commons', a view he credited to the famous Malthusian essay on the principle of population (Malthus, 1798). According to this view, the establishment of a common property regime which is a social arrangement regulating the preservation, maintenance and consumption of a common pool resource (Gebreegziabher *et al.*, 2011) would be required to regulate the use of the resource.

Access to land and livelihood assets may change over time due to state policies and regulatory instruments. Ayivor and Kufogbe (2001) noted in a case study of the Volta River floodplain, how the agriculturally rich pre-dam flood-recession area adjoining the river has changed in economic value. The change was as a result of dam construction across the river and the consequential change in the hydrological regime of the floodplain. Mbaiwa *et al.* (2008) also demonstrated how state regulatory instruments have denied the poor in the Okavango Delta of Botswana, their customary and usufructory rights and access over lands that have been designated as protected areas or leased as concessions. Such policies according to Mbaiwa *et al.* (2008), decimate the already marginalized resource-base subsistence livelihoods and precipitate conflict over resources. In rural societies, the landless and those with insecure tenure rights, to a large extent, constitute the most poor, marginalized and vulnerable groups. The rights of the poor tend to be secondary, rarely extending beyond use rights. Moreover, these rights are often unprotected and weak, especially for women (IFAD, 2008).

Studies in the lower Volta basin of Ghana have shown that gender inequalities exist in landownership, largely attributed to the pre-eminence accorded to men by local traditions and customs embedded in the patrilineal inheritance system (Ayivor & Kufogbe, 2001; Duncan & Brants, 2004). The studies revealed that men in the region often have full (primary) access to land whereas women often have partial or conditional (secondary) access. Women only had primary access in cases of outright purchase or through bequeathal by parents, grandparents and/or spouses. Men therefore dominate landownership regime, which is vested in lineages, clans, stools and family units. This system has implications for those with restricted access to land resources.

In the specific case of the lower Volta basin, the situation appears even more complex as land rights and access are linked to the handicraft industry which has its own inherent constraints. A recent study by Redzuan and Aref (2011) on the handicraft industry in poor regions of Malaysia revealed demand and supply constraints. Demand constraints relate to factors that restrict the size and pattern of the markets including low demand and a fall in demand for the craft products within a particular market. Supply constraints on the other hand, relate to factors that limit the production and availability of the products of the various crafts. They include lack of skilled labour, difficulty in obtaining raw materials, reluctance to adopt modern methods of production or technology, lack of credit facilities and inadequacy of quality control measures in the production process (Redzuan & Aref, 2011). Clearly, the poor and vulnerable, especially women, need access to resources through a system of common resource management regimes for sustainable livelihood enhancement.

Study area and methods

Study area

The study was conducted in the lower Volta basin of Ghana. This area is between Keta Lagoon to the east and Songor Lagoon to the west, and limited to coastal communities (Figure 1). The area is ecologically diverse and consists of the Volta estuary, coastal lagoons, tidal creeks, swamps and coastal savannah lowlands with their associated vegetation. A bimodal rainfall pattern characterizes the area, but with low rainfall values, averaging 740–910 mm (Ayivor, 2001). The average altitude is less than 50 m above mean sea level. Two major drainage systems of interest to the study are the Volta and its associated creeks, and the Tordze River to the east. Cyclical flooding of these rivers and the Keta and Songor lagoons promotes the growth of reeds, particularly in depressions where water collects around the lagoon shores.

Most of the soils in the reed growing areas are not particularly good for crop production, except sugarcane. The coastal lagoon margins are dominated by the Ada-Oyibi Association (Vertic Cambisol (Gypsi)-Salic Solonetz Association). These black or dark grey sticky clays occur extensively in less saline areas, with mottled sandy clay loams. The Muni series (Sali-Eutric Fluvisol), encrusted with salt crystals at the surface, also occur on almost bare lagoon margins (Wills, 1962; Ahn, 1970).

The area consists principally of open grassland with isolated thickets. The vegetation has four main groups: thickets and woodlands on the highest ground (over 9.1 m above mean sea level), grassland on higher ground (over 9.1 m.a.s.l.), sedge marshes on lower

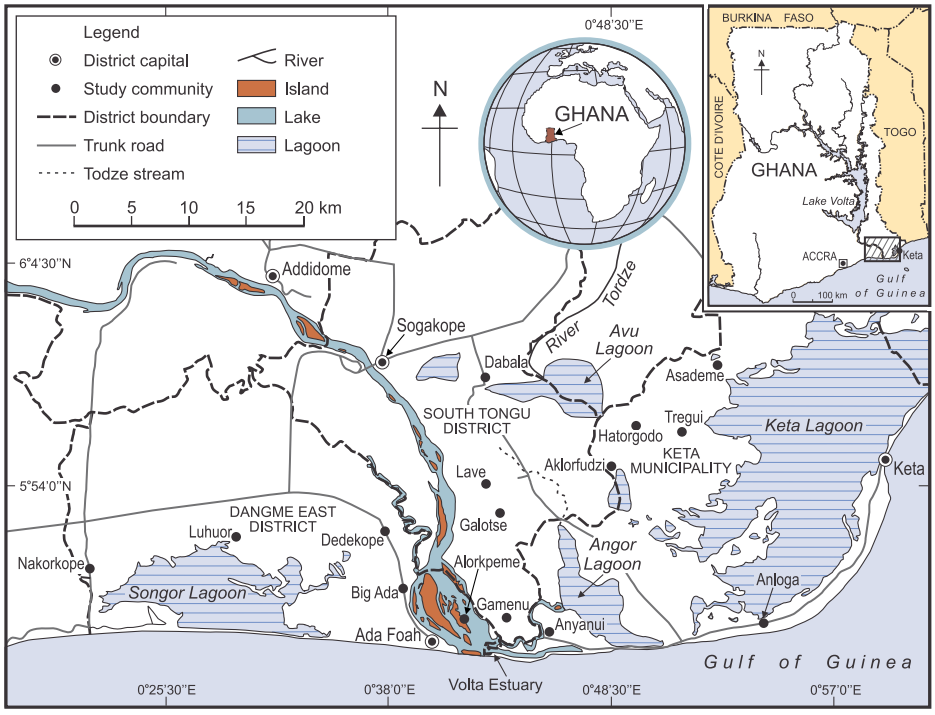

Figure 1. *Map of the study area.*
Adapted from Ofori (2000).

ground (below 9.1 m.s.l.) and mangrove swamps and aquatic plants (below 5.1 m.s.l.) (Ada Songor Salts Limited, 1994).

Methods

Primary data for this study were collected through field work conducted from April to August 2008 by the author and two assistants. The study was conducted in the three coastal areas of the lower Volta basin namely Keta Municipality, South Tongu District and Dangme East District (Figure 1). 152 mat weavers, made up of 98 females and 54 males from 18 mat-weaving communities were contacted. A participatory rural appraisal approach (PRAA) was used in the study. The PRAA, as explained by Chambers (1994), embodies several research instruments including focus group discussions, in-depth interviews and on-site observations. It serves as a reliable approach of collecting qualitative data as it engages participants in open and frank discussions (Chambers, 1994).

There was at least one focus group discussion in each of the 18 communities visited using a check list. The 152 group discussants in all the communities were selected with the assistance of village elders/opinion leaders. It was based on the individual's level of involvement in the mat-weaving industry. Each group had an average of eight people aged between 18 and 74 years. The discussions focused on livelihood strategies in general and on current and past land tenure systems and their impact on access to reeds and other mat-weaving materials in particular. Participants were also made to rank their major and minor occupations in a participatory manner to facilitate occupational ranking within these communities. In addition to the focus group discussions, 7 landowners from 7 major mat-weaving communities, including 3 chiefs, and 10 mat distributors were also identified and interviewed. In all cases, responses were tape-recorded and transcribed with the help of the two research assistants. Secondary data were derived from both published and unpublished sources, notably reports and working papers, to supplement the primary data.

Reed cutting and mat production in the lower Volta

Reeds used for mat production

Reed is a generic name for tall strong hallow-stem sedges or grasses commonly associated with wetlands (Hall *et al*., 1971). For the purpose of this paper, the term 'reeds' is used to refer to the raw material used for mat weaving. Reeds survive in slightly saline marsh water areas but are intolerant of highly saline conditions. Their natural habitat according to the locals is not suitable for planting the main staple crops of the area apart from sugarcane. Three main types of reeds are important for mat weaving, according to the survey: *Cyperus articulatus* (Nut grass), locally called *keti*; *Typha domingensis* (Bulrush or cat-tail), locally called *ava*; and *Scirpus littoralis*, locally referred to as *ayeke*. Fresh water plays a very important role in the availability of reeds. *Keti* and *ayeke* normally sprout at the onset of the rainy season in April/May but they may also sprout along lagoon shores when rainwater from upstream swells the lagoon water. In the Keta and Tongu areas, *keti* is most widespread, though in most cases, it does not grow tall enough to be economically useful. *Keti* grows particularly well in the lower basin of the Todze River to the east of the Volta Estuary, where a network of 10 other smaller streams converges. Here, fresh water supplies are unhindered as there is no hydrological disturbance (by comparison with the situation in the basin of the lower Volta itself). The availability of reeds in the Todze basin makes mat weaving a very vibrant activity in the Lave and Galotse area, which lies in this basin.

Table 1. Harvesting period of reeds in selected locations.

Location	District/Municipality	Peak period
Avu Lagoon area	Keta	January–March
Hatorgodo, Asademe area	Keta	November–December
Akporfudzi, Tregui area	Keta	May–August
Luhuor, Nakorkope, Big Ada Dedekope area	Dangme East	August–December
Lave, Galotse, Gamenu area	South Tongu	June to November

In the Dangme area to the west, *ayeke* is the most economically useful reed available. It was the dominant type in about two-thirds of the area surveyed, perhaps because of its tolerance of high salinity conditions, which characterizes the numerous lagoon fringes in the area. *Keti* ranks second in terms of availability in the Dangme area according to local people, followed by *ava*, which does better under relatively fresh water conditions along the shores of the Volta River. In almost all cases, the reeds were located between 0.5 km and 5 km from the communities. Three time periods were observed as peak periods for reed harvesting, based on local conditions, as indicated in Table 1.

Local management of reeds may enhance or reduce their availability. In the Hatorgodo area of the Keta Municipality, it was observed that *keti* grows better when cattle graze on the marshlands (*keti* fields). Cattle do not actually feed on the reeds but selectively graze on other plants, which tend to compete with reeds for space. Once the 'weeds' are removed, the reeds grow very fast to the preferred length. Another local management strategy to enhance their growth is burning. After a prolonged dry spell, the reeds do not immediately regenerate until the onset of the next rainy season. Setting fire to the dried up reeds and the reed-stumps left after harvesting enhances early regeneration. These management strategies exemplify what Nicholas (1998) and Dixon (2005) referred to as community management strategies, which according to them, have proven to be very sustainable.

Factors governing access to reeds

Ownership of land-based resources notably reeds, according to field work findings, was based on one's status in the family (e.g. head of family), community's tenure regime and an individual's ability to pay for reeds plots or dried reeds from the open market. IFAD (2008) observed that women in the lower Volta basin were disadvantaged in terms of access because traditionally, they have no land rights. Based on the concept of 'relationship between land tenure issues and rural livelihoods', it is clear that most women in the study area who lack access to land would also lack the requisite assets to achieve positive livelihood outcomes (DFID, 1999). The women, therefore, considered themselves as poor because, in their own assessment, they lacked education and empowerment, job opportunities and financial capacity to meet basic needs like healthcare, and yet bore an additional burden of child upbringing. Available national records show that the incidence of poverty in Ghana's rural coastal areas was 0.452 by 2000, compared to the national average of 0.395 and 0.038 in the urbanized Greater Accra region where the capital city, Accra, is located (Coulombe & McKay, 2004).

In about a third of the reed-growing areas in the Dangme East District, access to all three types of reeds was essentially free. In the remaining two-thirds of the district, however, *keti*, the most preferred of the three types of reeds, was being sold on the field as '*keti* plots' for a sum equivalent to approximately USD 10 per plot of size 10m × 12m per season. Wealthy individuals, mainly female traders from outside the communities

regularly negotiated with landowners for the purchase of these plots. Each plot yielded 10–15 bundles and one bundle produced 4 large mats (*tsatsaga*) and 12 small mats (*aba*). They either used the reeds for mat weaving themselves or sold the reeds to other weavers after cutting, drying and bundling them into standard sizes.

In the Songhor area also in the Dangme East District, where land largely belonged to the communities and other competing land-use occupations like farming, aquaculture and salt winning provided alternate sources of livelihood, there was no restriction on access compared to areas where alternative economic opportunities were fewer. This supports an earlier observation by Dixon (2005) that access to wetland resources including reeds and sedges may enhance livelihoods of the poor, even though the value of such resources may not be recognized elsewhere.

In the South Tongu and Keta areas, access to reeds was generally free within an individual's own clan lands, but in privately owned lands, it was necessary to pay for the reeds. In areas where the system allowed for free access, notably within communal lands and lagoon shores which were administered by the stool heads, it remained free for both strangers and indigenes and was broadly regarded as a common property resource. According to Fuys *et al*. (2007), access to such resources through common property regimes often sustained and enhanced the livelihoods of poor families and communities. When a fee had to be paid to gain access, it was paid in kind (the harvested reeds in this case are normally shared in a ratio of 1:2 in favour of the tenant), or alternatively there may be outright purchase of reeds on the field by cash.

In the Keta Municipality, access to reeds was free around the immediate fringes of the Keta Lagoon where the land was under the control of traditional leaders (the Anlo stool). At Tregui, a popular mat producing centre along the lagoon shores, residents of the community expressed strongly during focus group discussion that they would resist any price imposition on reed access if anybody tried to do so. Some landowners admitted during interviews that it became necessary to impose charges on access to reeds because mat production had moved from a subsistence activity to a commercial enterprise, which means that market forces had to regulate access due to the increasing demand. In line with Malthusian classical theory, Gebreegziabher *et al*. (2011) noted that such imposition of charges is required to regulate the overuse of the resource.

Elsewhere along the lagoon shores where people had to travel for longer distances by boat to access the reeds, no charges were imposed. Some respondents, however, expressed reservations about the effects of a sea defence wall constructed along the eastern coastline in 2004 to avert sea erosion. According to them, the wall caused the saline lagoon water to flood the lagoon shores where reeds grow. This affects the growth and supply of reeds, especially *keti* and *ava*, as they cannot withstand saline conditions, and individuals have to spend more time and travel longer distances to obtain them.

The analysis above underscores the broader theoretical literature on common property resource, which according to Wade (1988) is always a 'commons situation'. According to this assertion, any resource characterized by joint use and subtractive benefits is potentially subject to overuse, depletion and degradation. Gebreegziabher *et al*. (2011) suggested a social arrangement to regulate the overuse of the resource in situations where joint use and subtractive benefits are combined with scarcity, and 'commons situations become commons dilemmas' (Wade, 1988: 184).

Reed cutting and mat weaving

Reed cutting provides the raw material for the mat production industry. Reed cutting and mat weaving, though two separate activities, are both carried out mostly by women.

Generally, those in need of higher income but are unable to afford the raw materials for mat weaving, cut reeds to sell either to neighbours or in the open market rather than making mats themselves. Though most mat weavers would prefer to cut their own reeds to maximize profits, elderly women who can no longer go out to the field buy the cut reeds for weaving.

Once cut, the reeds are head-loaded home and sun-dried for 3–7 days to reduce their weight (Ofori, 2000). A day's average cut in a good season (i.e. June to November), according to the findings, could provide sufficient material to weave up to 8 small mats. Women weave an average of 5–8 small mats per day whereas men weave about 10 large mats a day. Small mats are more laborious and time consuming to weave, and women also perform other household activities, while men normally devote the whole day for mat weaving.

Production of small mats is more widespread and principally a task undertaken by women and girls because it requires less reeds compared to large mats. Since most women have restricted access to marshlands, it is more cost effective to produce the small mats to optimize the use of the resource. Inputs needed for production of the small mat, apart from reeds, include a locally improvized wooden frame, nylon thread and dyes. The nylon thread is mounted on the wooden frame which is raised vertically on the ground to facilitate weaving (Figure 2). Dyed reeds of different colours are inserted during the process of weaving to give it a multi-coloured design, which determines the quality of the mats produced. Children between the ages of 6 and 10 often help their mothers in mat production because the process is fairly lengthy and labour intensive (Figure 2). About three out of every five women contacted during field work indicated that they involved their children in mat making because the proceeds helped to pay the children's school fees. They did not consider this as child labour since children were only assigned light duties.

On the other hand, large mats are mainly woven by men (Figure 3) between the ages of 16 and 35, because the production process is more strenuous, especially

Figure 2. *Women and children weaving small mats (aba) on locally improvised platforms at Lave in South Tongu District. Photograph © J. S. Ayivor.*

Figure 3. *Men weaving large mats (tsatsaga) on the floor at Lave in South Tongu District. Photograph © J. S. Ayivor.*

during cutting and transportation. The large mats are woven on the floor using locally made twine, the only input apart from reeds. The main production centres of large mats are Lave, Galotse and Gamenu (Figure 1) where reeds are found in abundance due to the presence of fresh water streams.

Mats are mostly used as sleeping mats, but are versatile, as they are easily folded and stored when not in use. They have a standard dimension of 1.6 m by 1.2 m and are distinguished by their thickness. A large mat is about 6 cm thick and is used as mattresses either on the bare floor or on wooden beds by the rural and urban poor who cannot afford imported mats or foam mattresses. This is especially the case in Volta lake-shore communities about 250km away from the producing centres and slum communities of major southern cities of Ghana, notably Accra, Tema, Takoradi and Kumasi. The medium-sized mat or *tsatsavi* is about 2.5 cm thick and the small mat, which is about 1.5 cm thick, is the most popular. Small mats are used as indoor and outdoor sleeping material as well, but are also used for ceiling traditional houses, fencing, decorating walls, partitioning of rooms and as door or window curtains in drinking bars, street food stalls and rural recreational centres. Ofori (2000) noted that the small mats are used as packaging material for local haulage of goods.

Transport is not easily available during the rainy seasons when the lateritic roads leading to the producing centres are flooded. In such instances, women who cannot afford to wait till the end of the rainy season to sell their reeds are compelled to sell their products at a cheaper rate to middlepersons when they could have obtained higher prices at the market centres. The middlepersons would then stockpile the mats and send them to the markets when the rains are over (Figure 4). The mats are sold in nearby market centres such as Anloga, Dabala, Anyanui and Akatsi. Dealers from Accra, the capital of Ghana, located about 130 km away, as well as other parts of the country visit these markets or individual producers to purchase the mats.

Figure 4. *Stockpile of large mats awaiting transportation to the market centres. Photograph © J. S. Ayivor.*

Despite the widespread use of the mats, their prices remain low because they are targeted at the poor and increasing the prices would most likely reduce the demand as the product has a low elasticity in market prices. Small mats sell for about USD 3–5 each, depending on the type of material used. Most of the mat weavers earn over USD 2 per day, higher than the World Bank's threshold of income below the poverty line for developing countries, pegged at USD 1.25 (Ravallion *et al.*, 2009). For female and poor mat weavers, the meagre but steady income has immensely improved their living conditions.

Many respondents suggested that whereas mat weaving was essentially a minor non-commercial activity in the pre-dam era, mat production has become a common income source for women of all ages after damming. A common pattern at Tregui, a lagoon shore settlement in Keta Municipality, is to build up capital from mat making and invest it in the purchase of distillery equipment to make *akpeteshie* (gin produced from sugarcane juice).

Constraints to access to reeds and the mat making industry

Impact of the Volta River dam on economic activities of the study area

Historical data of the study area revealed that the damming of the Volta River in the early 1960s for hydroelectric power generation, about 80 km from the study area, was an event with major hydrological significance (Lawson, 1972). Field investigations confirmed that before the damming, the seasonal flooding of the Volta, which commenced from about September to November created excellent conditions for the growth of reeds. However, with the change in the hydrological regime of the Volta after the damming upstream, the growth of reeds has greatly declined in the area from the 1970s except for the undisturbed Tordze River basin. This decline in the availability of reeds, coupled with the decline in alternative income sources for women such as trade in freshwater clams, which was a vibrant pre-dam activity (T-Vieta, 1989), had exerted pressure on this once freely available resource.

The role of local institutions and the middlepersons

Local institutional arrangements like the land tenure regime prevalent in a particular place and the role of middlepersons tend to affect access to reeds especially by women. In the case of lower Volta, women have no land rights because of the patrilineal land tenure system prevalent in the area (Ayivor, 2001). Field investigations showed that landownership rights vary from one ethnic group to another. Individual rights were more pronounced in agriculturally productive depressions in the Dangme District where vegetable farming was dominant, and around sandy offshore areas where shallots and onions were cultivated in both Keta and Dangme areas. Land is more valuable in these areas, according to the findings, than in areas of little agricultural significance, a situation which has fuelled debates on access to land for agricultural production versus access to land and land-based resources for other uses (Morgan, 1996; Baumann, 2002).

The growing pressure on the reed marshes since the 1970s has led to an increased role of the middleperson and reduced potential for weavers to obtain reeds directly from the landlords. Weavers had no direct access to reeds but had to go through a host of agents including wholesalers of dried reeds on the open market within the areas.

Figure 5 illustrates the various channels through which the mat weavers may gain access to reeds. The clan head/traditional authority at the apex of the access channel, is the sole custodian of land. Private landowners and family heads are both accountable to the clan head. Middlepersons and weavers may either buy 'reed-plots' in the field or negotiate with the landowners for access to harvest the reeds, after which the proceeds are shared with the landlords. Middlepersons can sell reeds directly to the weavers within the communities or bundle the reeds and sell them at local market centres. Weavers may also have direct access to reeds from clan heads depending on the weaver's clan. Weavers who are unable to harvest reeds due to either old age or lack of access tend to purchase reeds from the market centres. Others buy directly from landowners if they have sufficient funds, or obtain them through middlepersons.

Many mat weavers are now dependent on pre-financing by agents at a specified unit cost of mat. Most weavers avoid this practice if they can, since it reduces their profit very

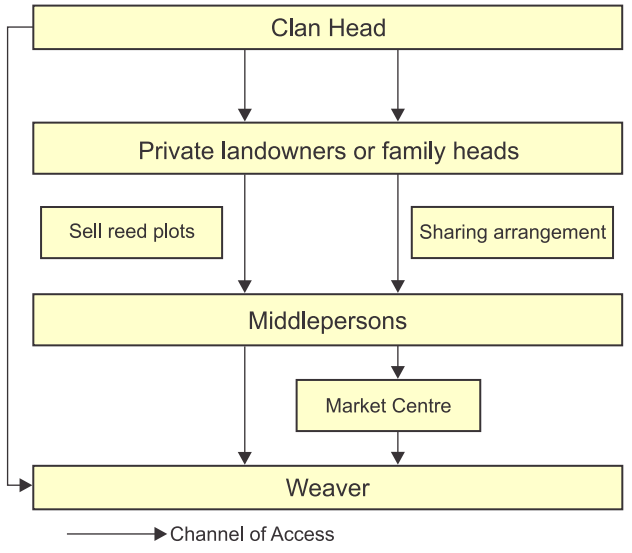

Figure 5. *A model showing channels of access to reeds in Lower Volta.*

substantially. However, the growing need for women to purchase access to reed fields or buy the reeds themselves is leading to widespread dependency on advance payments and involvement of middlepersons. Again, it must be noted that this adverse change in conditions mostly impacts women, since they represent the majority of mat weavers.

Climate change

The growth of the reeds elsewhere in the area, according to the residents, is now controlled by rainwater, which collects in depressions and other low-lying areas. Unfortunately, rainfall along the eastern coast of Ghana, including the study area, is very low and highly erratic, averaging below 910 mm annually, compared to over 2000 mm along the western coast. Field reports backed by literature suggested that there has been a reduction in rainfall intensity, frequency and distribution in the area since the 1970s (Nicholson, 1994), a phenomenon which the local people have attributed to climate change. In the South Tongu and Keta areas to the east, reduced rainfall is also now impacting agricultural productivity and has encouraged a shift to increased mat production because of lack of alternative sources of livelihood.

Land conversion

Another potential threat to mat production is the conversion of reed fields to sugarcane fields and aquaculture ponds. There is increasing cultivation of sugarcane in the swamps to feed the growing number of local gin distilleries, which are springing up in the area. Landowners are likely to convert reed fields to sugarcane farms if the former are more profitable than reed fields. A further threat is the emerging trend of fishpond construction, which is widespread in the Dangme District. The aquaculture ponds have already led to the destruction of some reed swamps at Ada-Foah and Alorkpeme close to the Volta Estuary.

Competing demands for reed swamps from alternative potential uses are not new in this area. Akyeampong (2001) noted earlier the (nineteenth-century) replacement of women's reed sources in the Anloga area by sugarcane and shallot farms. Olwig and Gough (2013) observed a similar situation in northern Ghana where 'straw fields' for the basket weaving industry, have been converted to residential areas, resulting in a shortfall in supply. These growing pressures and consequent increasing constraints on access to reeds have substantial implications for the mat-weaving industry as a whole.

Coping strategies

Fieldwork revealed that residents with less resources (including a majority of women) undertake lagoon fishing (which can be accomplished with minimal equipment), small-scale rain-fed crop production, salt winning in the dry season, petty trading and a range of small enterprises, including mat weaving and related crafts. In occupational ranking by the communities surveyed, although only three communities ranked mat weaving as their major activity, five ranked it in second place and nine in third place (see Table 2).[1]

One interesting small initiative suggests a potential way out of the growing dependency on middleperson credit. A group of weavers comprising 95 per cent women in one of the island settlements in Dangme East District near the Volta Estuary have organized themselves into an association 'Mawulehaano' ('God is our provider' in the Dangme language). They obtained micro-credit support from the Growth Integrated Development Programme, a local nongovernmental organization (NGO), at a relatively low interest rate of 20 per cent (compared to bank charges which at the time stood at

Table 2. Occupational ranking of communities in the study area.

Economic activities of study communities	Ranking of activities		
	Primary	**Secondary**	**Tertiary**
Farming	10	5	1
Fishing	4	3	4
Mat weaving	3	5	9
Salt winning	1	0	0
Petty trading	0	2	3
Distillation of local gin	0	2	0
Fire wood gathering	0	1	0

30 per cent). This pre-finances all the costs incurred in the process of mat weaving, including getting access to reeds, and obviates the need of obtaining credit from middlepersons. The majority of women in the association can now afford to store reeds purchased in the wet season when they are cheaper, in anticipation of the dry season when reeds become scarce and expensive. This allows them to continue mat production all year round.

Conclusions

The expansion in demand of reeds in the lower Volta basin was occasioned by ecological changes that occurred in the aftermath of damming the Volta River and the consequential loss of flood-dependent economic livelihood activities. Residents whose livelihoods were affected had to resort to alternative means of livelihood, such as reeds cutting and mat weaving after the 1970s. The influx of these affected residents, mostly women, into the mat-weaving industry and the expansion of the market for mats, translated into increased pressure on the resource, and profit margins remained low in order to keep mat products within the purchasing power of buyers. Access to reeds in most locations had ceased to be free due to the imposition of various payments regimes to regulate the overexploitation of the resource and also to allow landowners to benefit from the commercialization of the mat industry. To compound the problem, fresh water availability on reed fields has reduced after damming, thus inhibiting their prolific growth as was the case during the pre-dam era. The growing cost of reed purchase and the higher value they have attracted coupled with infiltration of middlepersons and low elasticity in market prices for mats, all decreased the weavers' profit margins. The looming threat of climate change on this climate-sensitive resource and the increasing conversion of marsh lands into sugarcane farms have also become a concern.

In the nutshell, the study on access to reeds in the lower Volta basin highlighted the growing pressure on reeds and its effects on the local residents. This pressure seems to be unnoticed though it affects the very survival and livelihoods of hundreds of poor mat weavers. The study concludes that tenure rights and limited access to land-based resources have a direct influence on people's livelihoods especially women, who in most traditional settings of Africa, are alienated from landownership rights. Another important conclusion is that changes in floodplain ecological conditions resulting from major hydrological disturbances like river damming can set in motion other socio-economic and institutional changes (notably occupational and land tenure changes) that tend to affect the poor and vulnerable.

These conclusions prompt one to consider the prospects for change. Provision of alternative means of livelihood in the long term is imperative for wetlands resource conservation. Both governmental and NGOs have a vital role in supporting activities such as small-scale livestock rearing and bee keeping among the affected residents.

The Ghana government's District Assembly Common Fund is supposed to be targeted at deprived and vulnerable groups. However, such funds tend to be focused on district headquarters and other accessible settlements (Kyei, 1999). Specific targeting of vulnerable groups living in less accessible locations—like the reed cutters and the mat weavers of the Lower Volta—is needed to assist in the search for additional income generating activities.

In the short term, provision of micro-finance to organized community groups in support of targeted economic activities, would help eliminate the activities of the middleperson. An example of such a scheme was observed in Dangme East District with its Mawulehaano association. The scheme involved provision of strictly monitored small loan schemes to the association to be paid back at a later date. Some market expansion or diversification in the mat industry can also be achieved by producing a range of higher value products targeted at the rich as well. Better finishing techniques could add value to the mats. However, this needs careful market research in both domestic and export markets.

While considering these recommendations, we need to be mindful of the complexity of social, environmental and political dynamics in the Volta Region (Akyeampong, 2001), including the fact that it is the least visible in these communities—poor women—who currently suffer from reduced access to reeds and would potentially benefit most.

Acknowledgements

The author wishes to thank Dr Gina Porter, Department of Anthropology, University of Durham, UK, whose initial ideas formed the bases of this research. The Volta Basin Research Project (VBRP), University of Ghana provided funding and logistic support for the research. Ms Cecilia Datsa and Mr Christian Sabblah, both of the VBRP, supported the field work. The author is also grateful to the academics and professionals of the University of Ghana/Carnegie Corporation of New York Project, for providing technical support and guidance in the manuscript revision at the December 2012 Write-shop.

Endnote

1 One community was excluded from this occupational ranking exercise. The respondents did not consider mat weaving as one of the major activities to be ranked, as only a few individuals in that community were engaged in mat weaving.

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